

REMARKS

Applicant would like to thank the Examiner for the careful consideration given the present application. The application has been carefully reviewed in light of the Office action, and amended as necessary to more clearly and particularly describe the subject matter which applicant regards as the invention.

Claims 1-6 stand rejected under 35 USC 103(a) as being unpatentable over Japanese Patent Hei 1-97813 to Yasuda (hereinafter Yasuda '813) in view of U.S. Patent 5,113,071 to Sawada et al. (hereinafter Sawada '071). For the following reasons, the Examiner's rejection is traversed.

Yasuda '813 discloses an optical displacement detector that includes a light emitting element for illuminating a measuring scale. Light from the element is reflected by a reflecting mirror with a concave surface. The reflected light is then directed by another reflecting mirror through a light transmitting resin mold to the measuring scale. The scale reflects the light toward a light receiving element in the light transmitting resin mold. The light emitting element and light-receiving element are die-bonded to a common lead frame.

Sawada '071 discloses an encoder in which a single light source projects dual beams onto a grating. As shown in Figure 5, reproduced below, laser light source 52 projects beams 52a, 52b from opposite end faces. Each beam is then reflected by a totally-reflecting surface 53a, 54a toward a scale 30 including a series of gratings 32. Before reaching the scale, each reflected beam passes through a lens 56a, 56b and is focused such that the two beams are converged upon common gratings 32 of the scale.

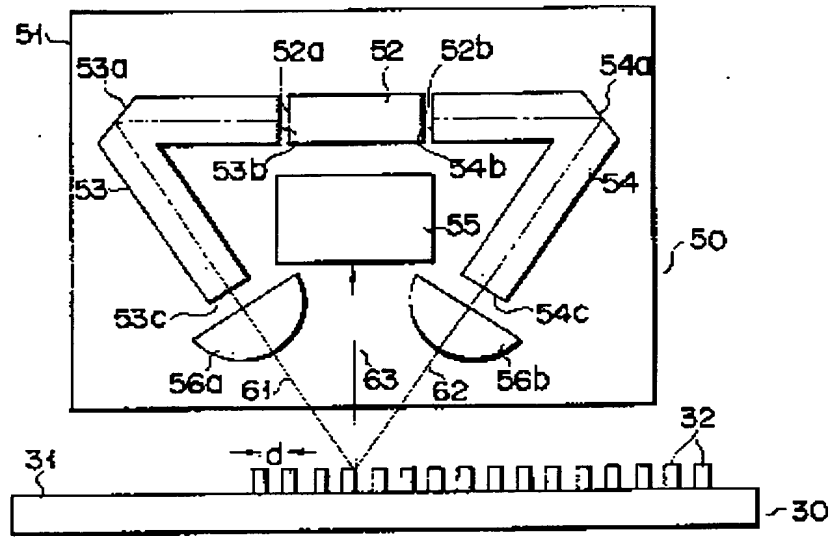


FIG. 5

Claim 1 has been amended to further describe the function of the second optical element, particularly that the second element reflects and focuses reflected light from the first element. In this regard, 'focusing' of the light by the second optical element is meant to clearly indicate that the reflected light converges toward the optical grating. Yasuda '813 clearly does not teach a second element that reflects and focuses light from a first element. The Examiner states that Sawada '071 cures these deficiencies in Yasuda '813. Applicant respectfully does not agree.

Even if the references were combined in the manner proposed by the Examiner, the present invention would not result. Sawada '071 teaches a lens 56a that when used in combination with a similar lens 56b converges two beams on a common area of a scale. Sawada '071 teaches separate totally-reflecting surfaces 53a, 54a. However the lens and surface are two distinct elements. Neither reference, either alone or in combination, teaches a "second optical element reflecting the parallel light from said first optical element and focusing the reflected

light toward the optical grating", as required by claim 1. In this regard it is important to note that the second optical element defined in claim 1 is provided by the molded transparent resin at a specified location relative to the first optical element. Clearly, neither of the references teaches an emitting light source apparatus including a molded transparent resin having the structural features set forth in claim 1. Thus, even if the Yasuda '813 and Sawada '071 patents were combined, the invention defined in claim 1 would not result.

Further, there is no motivation or suggestion in the art of record to combine the Yasuda '813 and Sawada '071 references in the manner proposed by the Examiner. Although both references are directed to devices projecting light onto measuring scales, the systems perform their function using different structures. Yasuda '813 includes a single path directing a beam of light to the encoder surface while Sawada '071 discloses an encoder that includes two distinct paths. Yasuda '813 uses a first reflecting mirror and a second reflecting mirror simply to significantly redirect a beam from a direction where otherwise the beam would not intersect the scale. Sawada '071 uses a single reflecting surface and a lens on each path so two beams, already directed toward a measuring scale, converge upon a specific area. The beams pass through the lens before reaching the scale.

The Examiner states that it would have been obvious to one of ordinary skill in the art to provide the lens of Sawada '071 in the second reflecting mirror of Yasuda '813. However, one of ordinary skill in the art of split or double beam encoders would not look to single beam encoders or vice-versa to make improvements to their relative designs. Thus, there is no motivation to combine the teachings of Yasuda '813 and Sawada '071.

Finally, it is believed that Sawada '071, by providing a separate, distinct lens (rather than the integrated second optical element of claim 1) actually teaches away from the structure defined in claim 1. The Examiner's attention to this fact is requested.

In light of the foregoing, it is respectfully submitted that claim 1 is patentable over the art of record. Further, claims 2-6, which depend from claim 1, are likewise considered to be allowable over the art of record. Reconsideration and withdrawal of the rejections of claims 1-6 is respectfully requested.

New claims 7 and 8 describe further types of emitting light source apparatus that are not disclosed in the art. These claims define particular configurations of the light-receiving element with respect to the light-emitting chip and second optical element, respectively. Consideration of new claims 6 and 7 is requested.

New Claim 9 is a combination of original independent claim 1 and dependent claim 3 with additional description of the path of travel of the light beam through the second optical element. New claim 9 also includes the structural features of claim 1 and, therefore, the arguments in support of patentability of claim 1 also to apply to new claim 9.

Claim 9 defines the second optical element as including a planoconvex cylindrical lens having a flat surface on which reflected parallel light is incident, and a convex spherical surface on the opposite side of the lens. The incident parallel light from the first optical element passes through the lens' flat surface and is reflected by the convex spherical surface back through the lens' flat surface and toward the optical grating. It is respectfully submitted that the art of record fails to teach such a lens being provided by the transparent resin as the second optical element. It is

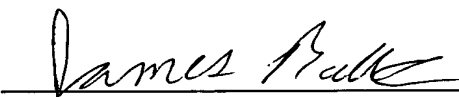
further submitted that the art of record fails to disclose or suggest the arrangement of structural elements that results in the light path through the lens, as required by claim 9 and discussed hereinbefore. Claims 10-15, which depend from new independent claim 9, are likewise considered to define allowable subject matter. Accordingly, favorable consideration of new claims 9-15 is requested.

In light of the foregoing, it is respectfully submitted that the present application is in a condition for allowance and notice to that effect is hereby requested. If it is determined that the application is not in a condition for allowance, the Examiner is invited to initiate a telephone interview with the undersigned attorney to expedite prosecution of the present application.

If there are any additional fees resulting from this communication, please charge same to our Deposit Account No. 18-0160, our Order No. NGB-12970.

Respectfully submitted,

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